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A State of Disrepair:

How to Fix the Financing of Municipal Infrastructure in Canada

Harry Kitchen

In this issue...

When municipal councillors fret over the crumbling roads, and antiquated water and sewer lines in our towns and cities, amid pressing demands for new and better infrastructure, their first job is unquestionable: get their financial houses in order.

The Study in Brief

How best to finance major municipal infrastructure projects? Roads, recreation centres, parklands and water and sewage services all contribute to Canadians' living standards — yet the financing methods for the construction and maintenance of these generally big-ticket spending items are commonly in a state of disrepair. Examples:

- The importance of separate capital and operating budgets for efficient, transparent and accountable capital investment is well known but rarely well handled. Many municipalities, including some large ones, do not have separate capital and operating budgets and, even where they do, there are problems with what is included or excluded.
- Lack of carefully constructed cost-benefit analyses for many large-scale projects means that costs and benefits are often incorrectly or incompletely documented or understood.
- Failure to coordinate capital projects between local departments and special purpose bodies such as utility commissions means that capital maintenance or construction is rarely coordinated with other projects — for example, when road and watermain maintenance and repair are not jointly planned.
- Finally, most capital spending is for short-term rehabilitation and renewal, even though longer-term projects might generate greater net benefits. This arises because municipal politicians tend to be interested in projects whose time horizons coincide with their terms of office.

Pursuing better practices and innovations in infrastructure financing would set towns and cities on better financial footing. The most important point is that municipal infrastructure should be financed, as far as possible, by the residents who benefit from it, because this provides the surest guide to how much should be invested in what.

The underlying principle of benefits received is straightforward: those who benefit from local infrastructure and the services it provides should pay for it. Other recommendations for policymakers and city managers: use multi-year capital budgets and dedicated fund accounts to plan longer-term projects. Municipalities should also take advantage of innovative approaches to infrastructure finance, such as a dedicated municipal fuel tax, parking lot taxes and private-public partnerships.

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Public concern over the state of municipal infrastructure in Canada and related safety and environmental issues raises questions about municipal funding. Crumbling, congested roads, antiquated water and sewage lines, inadequate public transit: all are issues that have moved from town council agendas to newspaper headlines, highlighting the importance of municipal capital investment and how it is financed. The challenge is nation-wide. As municipalities expand and age, more resources must flow to expanding, rehabilitating, or replacing local capital stock. Water, sewage and waste facilities, cultural and recreational complexes, transportation and transit need updating and expanding. Brownfield remediation must be addressed, and "blighted" areas of cities revitalized and redeveloped.

Most public infrastructure in Canada is the responsibility of municipal governments (Harchaoui, Tarkhani, and Warren, 2004; and 2001 Ontario budget). The importance of capital investment and the availability and quality of services provided by it are critical factors in improving quality of life, economic growth, productivity and international competitiveness (The Institute for Competitiveness and Prosperity 2005, 17). How this capital investment is financed, then, must not be treated lightly, for the choice of instrument and the way it is used may impact both the level of services provided by infrastructure and the size and range of the infrastructure itself.

Yet, municipal financing itself is in disrepair, in a manner of speaking, with best practices the exception rather than the rule in most jurisdictions across Canada. Among current shortcomings: politicians tend to support short-term projects with re-election in mind, rather than the welfare of future generations; accounting practices fail to include replacement costs for depreciating assets, thereby assuring a fiscal shock when replacement time arrives; there is seldom any relationship between who pays for new projects and who benefits from them. There is much room for improvement. Well-designed user fees and correctly structured local taxes will reveal the true demand for — and therefore, indicate the efficient supply of — local public infrastructure. Incorrect or inadequate user fees and local taxes promote under- or over-consumption of local services and too much or too little infrastructure (Gillen 2001; and Swimmer 2001).

Addressing this problem requires answering many questions. What is municipal infrastructure? What are the characteristics of good capital budgets and why are they important? What instruments are used for financing capital expenditures and how appropriate are they? What is the role of public-private partnerships? How should governments trace the revenue and expenditure flows associated with capital projects? And critically, what prices or local taxes will promote an efficient level and allocation of infrastructure investment? This *Commentary* addresses these questions and offers suggestions for future financing

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that should promote an efficient and more desirable level of infrastructure to better support Canadian living standards.

These suggestions include improvements in current financing methods: the use of multi-year capital budgets; dedicated fund accounts; and ensuring that those who benefit from a project bear its costs. I also recommend fresh alternatives that would further increase allocative efficiency, such as volumetric pricing for water, sewage and garbage services, and dedicated fuel or parking lot taxes, as discussed recently by the mayor of Toronto, David Miller. Municipalities should also give greater consideration to innovative approaches that have been tried with success in other jurisdictions, such as revenue bonds, tax increment financing and public-private partnerships (P3s).

What is Municipal Infrastructure?

Municipal infrastructure includes buildings, structures, facilities, equipment, rolling stock, furnishings, development and purchase of land, as well as the associated items to bring the foregoing into operation, and major rehabilitation work. Infrastructure expenditures differ from operating expenditures in three important ways. First, the financing of major infrastructure projects is lumpy in nature; that is, large expenditures in one year generally preclude similar expenditures in subsequent years. Second, benefits from large infrastructure projects often extend over many years. Third, infrastructure is often funded from special assessments, development charges, reserves, borrowing, grants, and own-source revenues, while operating expenditures are funded only from grants and own-source revenues.

Why Are Capital Budgets Important and What Should They Do?

A capital budget should be a multi-year financial plan for the construction or acquisition of capital projects and should indicate how they are to be financed. The importance of separate capital and operating budgets for efficient, transparent and accountable capital investment is well known (Bird 2005) but, often, not well handled in practice. Many municipalities, including some large ones, do not have separate budgets and even where they do, there are often problems with what is included and what is excluded. For example, future operating and maintenance costs are often ignored, especially when grants from senior governments are available. Similarly, municipalities often take debt costs into consideration, but they rarely consider foregone alternatives or depreciation and replacement costs in determining annual operating costs. Other problems include:

- Lack of carefully constructed cost-benefit analyses for many large-scale projects means that projected costs and benefits are often incorrectly or incompletely recorded.
- Failure to coordinate capital projects between local departments and special purpose bodies such as utility commissions often means that capital maintenance or construction is not coordinated with other projects — tearing up recently built or rehabilitated streets to work on water and

sewer mains, for example. Municipal governments often talk about integrated approaches to capital programs and growth management, but the numbers of people involved and their focus on selected aspects of the overall plan frequently impedes this objective.

- Finally, most capital spending is for short-term rehabilitation and renewal, even though longer-term projects might generate greater net benefits. This arises because municipal politicians tend to be interested in projects that provide visible signs of political initiatives and coincide with their term of office. As well, municipal decisionmakers also hesitate to commit to long-term projects without guarantees of future funding.

Municipal Infrastructure — How should It Be Financed?

Municipal infrastructure should be financed, as far as possible, on the basis of benefits received (Kitchen 2006), because this provides the greatest likelihood of securing a more allocatively efficient and optimal level of local capital investment. The underlying principle of benefits received (Duff 2003) is straightforward: those who benefit from local infrastructure and the services it provides should pay for it. The ability to set correct prices, taxes or fees depends on the asset. For assets such as water and sewers (where specific beneficiaries can be identified, income redistribution is not a goal, spillovers are few, and all operating and capital costs are measurable), charging for each litre of water should be relatively easy. For assets such as local streets and roads (where it is difficult to identify specific beneficiaries and where local spillovers may exist), setting local tax rates to capture local benefits is harder but not impossible. The benefits-based model is particularly important because it satisfies five important criteria:

- *Economic (allocative) efficiency*, which is achieved when the charge or tax per unit of output (service received) equals the cost of the last unit consumed, because this is the point where society secures the greatest net gain from the consumption of this service.
- *Accountability*, which requires that the design of a tax or charge be clear to taxpayers and that the link between the beneficiaries of a government service and payment for that service be tight.
- *Transparency*, which means that citizens/taxpayers have access to information and decisionmaking forums so they are familiar with the way in which local tax rates and user fees are set.
- *Fairness*, which is achieved when those who consume public services pay for them. Income redistribution is better achieved through income transfers or targeting (Boadway and Kitchen 1999, chaps. 8 and 9) than by tampering with charges or taxes.
- *Ease of administration*, which is satisfied when the financing system does not absorb unnecessary time and effort in administration and compliance.

The benefits model applies best where beneficiaries can be identified easily; where services do not generate spillovers or externalities (such as benefits or costs for

neighbouring communities); where redistribution is not a concern or can be handled separately; where governments can prevent individuals who do not pay from using the service; and where precise measurement of output and costs is possible.

Current Range of Financing Instruments

When current revenue sources are evaluated under the benefits-received model, it is apparent that their structure and use could be improved to promote efficient, accountable, and transparent public policy.

Internal Revenue Sources

There are a variety of revenues currently used by municipalities in Canada. These are listed below. Unfortunately, many of them are currently used in inefficient and sub-optimal ways.

General Operating Revenues. Rural municipalities, towns and smaller cities tend to rely more on local taxes, user fees and grants than on borrowing, partly because borrowers view them as higher risk than larger cities, thus raising their borrowing costs. Under the benefits-based model of municipal finance, financing capital spending from operating revenues is desirable to the extent that benefits accrue to current users. Municipalities often use current revenues for short-lived assets (such as police cars) or recurrent expenditures (such as the maintenance and upgrading of sidewalks, roads, street lighting, and parks). For longer-lived assets (such as sewer lines and water works), and non-recurrent expenditures (such as expenditures for libraries, museums, buildings, and other large fixed assets), using annual operating revenues violates intergenerational equity.

Earmarked User Fees. An earmarked user fee is dedicated to a specific project; for example, water and sewer charges for water infrastructure, disposal fees for solid waste facilities, and admission charges for recreational complexes. Earmarking has been criticized because it can channel funds inefficiently and connect expenditures with revenue sources in illogical ways. But intelligent earmarking for local public services can be efficient, accountable and fair (Bird 1997), especially when each taxpayer's consumption can be recorded, the extra cost of providing the service measured, correct prices charged, and non-payers excluded. Furthermore, if the tax charged is based on marginal cost pricing (Kitchen 2006), the incentive to make efficient investments is enhanced.

Reserves. Financing capital projects through funds set aside for capital spending is the reverse of financing through borrowing. A "capital levy" — usually a few percentage points of the local property tax — is set aside and accumulates in interest earning accounts segregated from general revenues. These reserves may be earmarked for general capital projects or for specific projects. Reserves, financed from general taxes, tend to violate the principle of intergenerational equity because current users and taxpayers pay for capital that future generations will use.

Special Charges on Property. Some municipalities finance infrastructure through special charges on properties: special assessments and local improvement charges;

and development charges; and exactions such as density bonusing, value capture levies, and parkland dedication.[1]

Special Assessments and Local Improvement Charges. A special assessment is a specific charge added to the existing property tax to pay for improved capital facilities that border them. The charge is based on a specific capital expenditure in a particular year, but may be spread over a number of years (Tassonyi 1997). Projects financed in this way include construction or reconstruction of sidewalks, streets, water mains, or storm sewers. The justification is that an owner of an abutting property will benefit from the local improvement and should, therefore, help fund it. While special assessments are only a small part of local budgets; they are an important means of financing local improvements.[2]

Development Charges. Most large municipalities and many smaller ones impose a specific dollar value per lot on developers to finance the off-site capital costs of new development. Developers are generally responsible for on-site services, such as local roads, sidewalks, and street lighting. Historically, development charges have financed "hard" services, such as water supply, sewage treatment, trunk mains and roads (Kitchen 2002). A development charge corresponds best to the benefits-received principle when the costs and benefits of the infrastructure for each property can be determined. An efficient development charge must cover the full cost of delivering the service: a capacity component which covers the capital cost of constructing the facility, plus a location or distance/density charge that reflects the capital cost of extending the service to properties or neighbourhoods (Downing and McCaleb 1987).

The most efficient development charges are those that vary by type of property (residential, commercial, or industrial), neighbourhood and distance from source of supply, so that each charge captures the extra cost of capital assets required to service the new or additional growth. Most Canadian municipalities, however, do not impose variable charges. Instead, they impose identical charges on all properties of a particular type, regardless of location. While administratively

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1 *Density bonusing* schemes exist in some larger Canadian municipalities where developers, through arrangements with municipal governments, are granted increased density allocations or density transfers in return for creating subsidized housing, daycare centers, restoring historic buildings and other services. *Value Capture Levies* permit a municipality to capture some of the economic rents created by municipal infrastructure (subway extension, for example). The developer may be required to provide various facilities and infrastructure, or cash, in return for being permitted to undertake a development that the new municipal infrastructure makes possible. *Parkland Dedication:* In larger municipalities, developers are often required to set aside land within the development or elsewhere, for parks. For example, the Provincial Planning Act in Ontario permits (but does not require) municipalities to enact local legislation requiring developers to set aside up to 5 percent of the area of land for new residential development and up to 2 percent of the area of land in the case of new commercial/industrial development. In Alberta, dedicated parkland amounts to 10 percent of the land area for new development. In lieu of this land requirement, however, the developer and municipality may agree to a cash payment equal to the market value of the stipulated amount of land. These funds, however, may be spent in whatever fashion the municipality chooses. In British Columbia, land must be dedicated for elementary and secondary schools.

2 Municipalities use several types of special assessments, and the correctness of the apportionment depends upon the base for assessment. The most common base, foot frontage of each benefiting property, is appropriate for projects whose cost per property increases with the width of the lot. For projects such as parks, whose benefits accrue to particular areas or blocks within a ....

convenient, this practice levies the same charge on residential dwellings in low-density neighbourhoods as it does on residential dwellings in high-density neighbourhoods. This occurs even though the marginal cost per property of infrastructure projects in low-density areas is higher, which can lead to urban sprawl (Slack 2002). Likewise, similar charges to properties that absorb different amounts of resources, because of factors such as terrain or soil type, will encourage development in the wrong places. While it may be naive to expect municipal officials to calculate the infrastructure cost for each new property, costs could and should be calculated for each new development area or neighbourhood, to discourage inefficient patterns of development.

External Revenue Sources

Municipalities also use revenues from external sources; specifically, from provincial and federal grants, and borrowing. As with locally generated revenues, these are often used in a way that fosters an inefficient and sub-optimal output.

Grants. Although municipal reliance on provincial and federal government grants for infrastructure has declined over the past 15 years in most provinces, capital assistance is available for water, sewer, and transportation projects with all three levels of government participating (Kitchen and Slack 2003). The most recent and widely discussed grant is from the five-cent-per-litre federal gas tax transfer.

Grants for infrastructure may be economically sound if the projects generate spillovers, or if they are of specific interest to donor governments. Here, the best type is a conditional grant that provides partial or full funding for a project with the funding rate set to match the proportion of benefits going to the donor government. However, these grants create problems.

First, they can distort local decisionmaking. Conditional transfers require municipalities to spend according to the guidelines of senior governments and often require matching funds on the part of the recipient municipality. This effectively lowers the price of municipal services and encourages municipalities to spend more on these services than might otherwise be efficient.

Second, funding from senior governments can also lead to inefficient local revenue decisions. In particular, grants that cover a large proportion of capital costs may reduce incentives to price services correctly, or to set up asset management and cost recovery programs.

Third, transfers can encourage people to stay in communities at risk. Some small, rural, and remote communities may be unable to provide adequate levels of service at reasonable tax rates (Kitchen and Slack 2006), or at reasonable user fees

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footnote 2 cont'd

a community, the best approach may be zone assessment, under which all properties in the serviced area pay the same share. Other possible bases for special assessments, such as lot size or charging each property based on their increase in value, are less satisfactory than foot frontage and zone assessments. A sensible approach is to split the cost of improvements that benefit an abutting property and the public at large by charging the bordering properties, for example, 40-60 percent of the total construction costs, with the municipality raising the balance. The challenge is to match the share assigned to abutting properties with the marginal benefit to those properties.

and require capital grants to survive. This raises a question about using grants to artificially support remote communities where they would otherwise not exist at all.

Fourth, funding large metropolitan capital works from grants can lead to increased regional inequality and distort metropolitan growth (Kain and Liu 2002).

Fifth, transfers reduce accountability. When two or more levels of government fund the same service, accountability problems exist when users are not sure which level of government is responsible for the project and the problems that may arise with it. International experience tells us that governments are more likely to carry out their expenditure responsibilities in an efficient, transparent, and accountable manner if they are also responsible for raising their own revenues (Bird 2001).

Economic arguments in support of capital grants are not strong. Their use should be conditional on recipient governments setting efficient user fees, prices and local taxes for services provided. As well, recipients should have proper asset-management programs, along with requirements that asset replacement costs be included in the charge for services. The practice of fully expensing capital expenses in the year of acquisition and not depreciating the value of capital assets often leads to under-pricing of services and over-investment in infrastructure.

Borrowing: Municipalities engage in both short-term and long-term borrowing. Short-term borrowing may be used to finance capital expenditures or to finance an unexpected deficit in the operating budget — municipalities in Canada do not have the authority under provincial legislation to budget for an operating deficit.

Long-term borrowing is restricted to financing capital expenditures. For infrastructure whose benefits accrue to future residents, fairness, efficiency and accountability is enhanced if these projects are financed by borrowing with repayment coming from property tax revenues and user fees paid by future beneficiaries. For example, borrowing is appropriate for fire and police infrastructure, recreational facilities, transportation infrastructure, and water and sewer systems. At the moment, many municipalities, especially cities, have the capacity for more borrowing but are reluctant to do so. This is attributable to a number of factors, the greatest of which seems to revolve around the cost of borrowing — a number of municipal officials still remember the high interest costs of the '80s — and a general desire on the part of many municipal officials to finance on a pay-as-you-go basis rather than by borrowing (Kitchen 2003), even when best practices suggest the latter.

New Financing Instruments

In addition to the traditional financing instruments, there are arguments for giving municipalities additional financing sources. This, of course, would involve a change in provincial legislation and practice — a notable relaxation of the controls that provinces currently place on municipalities.

Revenue Bonds: At the moment, municipalities in Canada use general obligation bonds. These are backed by the general revenues of the municipality rather than by a revenue stream from a specific asset (water revenues, for example). By

comparison, municipalities in the United States use both revenue and general obligation bonds. Revenue bonds are appropriate for funding infrastructure that generates a revenue stream to back the bond and where the beneficiaries of the project can be identified. Revenue bonds are an important instrument because they are fair, efficient, and accountable, as those who use the service pay for it. On the downside, they may be more costly if creditors perceive that the revenue stream is a less certain source of revenue when compared with general revenues that back general obligation bonds.

A Dedicated Municipal Fuel Tax: Many American cities levy fuel taxes, but municipalities in Canada do not. In a few Canadian cities and city-regions (Victoria, Vancouver, Edmonton, Calgary, and Montreal), provincial fuel tax revenues are shared between the province and the city or city-region. The federal government's recent initiative to provide grants to municipalities from federal gas tax revenue is a form of revenue sharing and not a municipal fuel tax because the municipalities do not set fuel tax rates and have no say over the tax base.

Municipally set fuel taxes may be viewed as benefit-based taxes where the revenues are earmarked for funding local roads and public transit. A municipal fuel tax could raise the cost of road usage to direct beneficiaries and lower the costs on others. Not only could the application of a municipal fuel tax raise the price paid by road users to a level that is more in line with the marginal social cost (production costs plus environmental costs) of providing roads, it would provide funds for improving and reconstructing local roads and public transit and lead to a more efficient use of local roads.

Earmarking municipal fuel tax revenues offers a number of advantages (Bird 1997). First, it provides a link between the cost of transportation and the tax rate necessary to fund it. Second, earmarking is likely to improve the efficiency of local decisionmakers. If funds are not earmarked, for instance, surplus revenues may be used for other purposes. This may discourage managerial efforts to improve efficiency and to reduce costs because excess revenues go elsewhere and may discourage investment that could lead to cost savings and increased efficiency. Third, there is no solid economic reason why local taxpayers should be subsidized from revenues generated by selling a specific good or service. Such cross-subsidization may lead to undesirable distortions and less efficient and accountable pricing and investment decisions.

Arguments for this tax at the local level are strongest when municipalities set their own tax rate and "piggyback" it onto the provincial fuel tax. A possible objection to letting municipalities set their own fuel tax rates is that it could lead to differentials across jurisdictions. While this may encourage people to purchase goods and services in, or relocate to, lower taxed municipalities, these concerns are no different than the location decisions caused by differential property tax rates. Furthermore, this tax competition can create an environment in which municipalities are more efficient in their use of resources and more accountable to their taxpayers (Bird and Wilson 2003).

There is clearly a tradeoff between the autonomy, accountability and flexibility advantages of local fuel-tax-rate setting and the disadvantages of different fuel tax rates across jurisdictions. Distortions, as well as competition, however, would be lower if regional taxing jurisdictions (regions, counties, districts) set local fuel tax

rates for large city-regions, with all revenues used to pay for region-wide public transit and transportation infrastructure.

Tax Increment Financing (TIF): This instrument works in the following way. For a specific period of time (long enough to recover all costs of public funds used to redevelop the property), tax incremental financing divides property tax revenue from the area into two categories. Taxes based on the pre-developed assessed value of property are retained by the municipality for general use. Taxes on increased assessed values arising from redevelopment are deposited in a special increment fund with revenue from this fund used to repay bonds that have been issued to finance public improvements in the redeveloped area. In other words, increases in property tax revenue from the redevelopment of an area are dedicated to financing public improvements in that area.

Typically, tax incremental finance-backed bonds are sold to provide up-front financing for the purchase and reclamation of the land, and for installation of public infrastructure, such as streets, streetlights, water and sewer lines, curbs, gutters and landscaping. Once the property is prepared, the land is sold to a private developer at a price that doesn't reflect the local government's cost of preparing the land — a technique known as a land cost write-down. All predevelopment and land-write-down costs are funded by bonds that are repaid from the special increment fund.

Tax increment financing districts (TIFs) are currently used by cities in the United States, where they play an important role in brownfield and infill development (Onyschuk et al. 2001). The application of TIFs in Canada is very recent and experience is limited. At the moment, they are used in Calgary (as of May 2005) and Winnipeg (as of August 2005) and they are under consideration by the Province of Ontario where a tax incremental financing model is currently being developed (Ontario 2005).

TIFs are intended to stimulate private sector investment in urban areas that need revitalization so that these areas may compete with suburban and exurban areas. TIF projects make sense if they address market failures. Supporters of TIFs argue that there is no transfer of funds from a local government to subsidize a business, nor any transfer of tax dollars from one business to another because development is financed from increases in the tax revenue that it generates (Slack 2002; Ontario 2005). Unlike bonuses or tax abatements where taxes are reduced or forgiven on a particular property, property owners in a tax increment district (TID) incur the same local tax rate as property owners outside the district. Preferential treatment is granted only in that taxes from the increased assessment base of the TID are dedicated to financing local improvements. Dedicated tax dollars reduce the risk and uncertainty facing the private sector. If used to stimulate downtown development (infilling) or brownfield remediation, TIFs could discourage urban sprawl (Onyschuk et al. 2001).

Public-Private Partnerships (P3): A P3 involves the direct participation of the private sector in a venture controlled by the public sector. The public sector's role is to facilitate, regulate, and guarantee provision of an asset and the private sector's role is to design, finance, build and operate the asset in a formalized partnership agreement. Recently in Canada, there has been a growing interest in public-private partnerships (Hrab 2003; Hrab 2003b; TD Bank financial Group 2006; Vander Ploeg

2006), especially for services with substantial capital costs.

Although there may be wide variation in the structure of a P3, it generally includes one of the following features:

- The private sector operates the facility for a fee. The public sector retains responsibility for capital costs.
- The private sector leases or purchases the facility from the public sector, operates the facility, and charges user fees.
- The private sector builds or develops a new facility, or enlarges or renovates an existing facility, and operates it for a number of years before transferring ownership to the public sector.
- The private sector builds and operates the facility and is responsible for capital financing. The public sector regulates and controls the operation.

A critical issue in the design of a P3 is the sharing of risks. In general, this depends on the type of partnership. The greater the private sector's share, the greater will be its expected rate of return. In principle, the party best able to deal with each type of risk at least cost should bear that risk (TD Bank financial Group 2006). This capacity to share risk is a major advantage of a P3. For example, the risk of cost over-runs, scheduling delays, and service demand should be borne by the private sector; whereas, the risks associated with changes in regulations and legislation, including changes in local taxation and environmental standards — things that cannot be controlled by the private sector — should be assumed by the government (United Kingdom 1997; Nova Scotia 1997). Clearly, an effective and efficient public partnership agreement requires that both parties understand the risks that each is to assume because incorrect risk assignment can lead to increased costs for the private sector and higher risk premiums than should be the case, or higher costs associated with resolving disputes for the public sector (National Audit Office 2001).

P3s provide a number of other advantages. They offer new sources of capital, freeing government revenues for other purposes. This is especially important when it is necessary to modernize crumbling infrastructure (Huang 2001). They let the public sector draw on private-sector expertise to minimize costs, an advantage especially important to small municipalities. Their contractual structure can encourage a "life-cycle" approach to planning and budgeting through the use of long-term contracts that include maintenance costs, asset replacement cost, and asset management plans (TD Bank financial Group 2006). They are a way of bringing competition into the public sector (Vander Ploeg 2006). Because the private sector operates in a competitive environment, it is almost always more innovative in infrastructure design, construction and facility management when compared with the public sector. Where P3 contracts are properly structured and based on performance measures, P3s can lead to improved local governance including increased accountability, transparency and value for money.

P3s are not without their critics, however. Indeed, the strongest opponents are public-sector unions (and their supporters) who view P3s as creeping privatizations, and regard them, perhaps rightly, as a threat to union membership. The strongest criticism of P3s, however, is that they are too costly. This perception

arises, partially at least, because it is argued that private sector borrowing is more expensive than public sector borrowing. This view, however, is short sighted. Lower interest rates for public sector borrowing exist because they are assumed to be risk free, which, of course they are not. Risks exist as long as there are potential problems with cost overruns, scheduling delays, and so on — problems that are common with public sector projects and lead to higher taxes in the future. The higher risks of private sector borrowing serve as protection against an unforeseen future cost on taxpayers. This higher rate of return protects the private sector just as "an extended warranty on a car or [an] insurance premium" protects an individual (TD Bank Financial Group 2006, 13).

Other criticisms include a loss of accountability and the sacrifice of quality for profit. These concerns are important and cannot be understated. Their resolution, however, is not necessarily in retaining public sector provision, but rather in designing carefully negotiated contracts based on performance measures that reflect results and outcomes rather than inputs. As well, this concern is likely overstated because private sector providers operate in a competitive environment where poor quality, low standards and lack of accountability will lead to lost business and firm closures down the road.

Although there is little experience in Canada, evidence from the United Kingdom, where the use of P3s is fairly widespread, indicates that P3s delivered an average saving (ex post) of 17 to 20 percent compared to conventionally provided public infrastructure, even though private sector borrowing costs were higher (Partnerships UK 2003). Similar results have been noted in other countries (Hrab 2003 and 2003b; Grimsey and Lewis 2004). At the same time, P3s have led to improved efficiency, most notably in the presence of competition (Harris 2003; Hrab 2003; and Grimsey and Lewis 2004) and even where service provision has remained largely monopolistic, private participation has delivered better results than the public sector (Harris 2003), particularly where services have "private goods" characteristics.

There is no clear-cut recipe for projects that could be funded and delivered through a P3. The range can be large, but the complexity of P3 contracts may put a floor under those that are practical. For example, the United Kingdom recently ruled out P3s for small projects costing less than 20 million pounds but deemed P3s to be valuable for major projects with high annual maintenance costs, or where private sector project management skills, innovative design and risk management expertise can provide substantial benefits (HM Treasury 2003; and Commission on Public Private Partnerships 2001).

Based on existing experience, local infrastructure projects that are suitable for P3s include transportation projects; water and sewage systems; recreational facilities; urban regeneration projects; and convention centres (Hrab 2003; and Hrab 2003b). A P3 may be most appropriate when outcomes can be clearly defined (Grimsey and Lewis 2004), proper incentives can be introduced for encouraging private partners to get better value, and if there is clear communication and accountability between the private and public partners.

Because public-private partnerships are monopolistic in nature, there is a role for government in monitoring their behaviour. Governments should set the terms and conditions for service delivery, funding, quality of service, and establish

performance standards or measures. Government could even lay out the pricing structure to be used for services provided by the infrastructure (volumetric pricing for water and sewers; tolls for roads; user fees for solid waste disposal) or set up a price regulation or monitoring system (Kitchen 2006).

For a P3 to be successful, the most critical feature is the contract design and, within the contract, the sharing of risks. Structuring a contract is not an easy task. It requires a considerable amount of expertise and experience, something that individual municipalities are unlikely to have if left on their own. The Netherlands, United Kingdom, New Zealand, and Australia have considerable experience with successful P3s and this is largely because the central government took the initiative, early on, to put together the necessary ingredients for successful contracts. Canada, by comparison, lags behind although this appears to be changing. British Columbia is the furthest along in developing a robust P3 model and strategy. More recently, Ontario, Quebec, and Alberta have started to move forward with models of their own. All of this suggests that the basic ingredients, necessary expertise and experience for increased municipal participation in P3s are emerging.

Problems with the Accounting Framework for Infrastructure Financing

Full and accurate accounting for all capital and operating costs of a project is critical to good decisionmaking. Unfortunately, asset replacement costs (the value of the asset used up in a particular accounting period, generally a year) are sometimes excluded; often because the local infrastructure was funded originally by grants. This was treated as "free money" that need not be recovered through asset replacement charges. This has two potentially serious consequences. Not recording a major cost means that prices or taxes for services provided by the infrastructure are lower than they should be leading to over-use and over-investment. As the infrastructure deteriorates and needs to be replaced, moreover, no municipal revenue has been set aside for replacement.

Recent reductions in provincial grants for capital projects have highlighted these consequences, leading to concern over the way asset replacement costs are incorporated into pricing and taxing decisions. Fund accounting is particularly appropriate for this task, because it polices the use of government resources in compliance with legal and budgeting constraints (Holder 1996).

Within fund accounts, there are three possible accounting bases — cash, accrual, and modified accrual. Cash accounting records expenditures and revenues when funds are actually disbursed or received. It has the advantage of being simple. Accrual accounting is the more commonly accepted approach. It records transactions when they occur regardless of when expenditures are made or funds received. Modified accrual accounting, which municipalities in Canada are required to follow, adopts the same principles and approach with the exception that depreciation and a return on capital are not included as costs. Revenues are generally budgeted to produce operating surpluses that finance ongoing or future investments, leaving municipalities in the position where they are not as likely to face cash flow problems. However, to fully recover all costs over the service life of

the asset, full accrual may be preferable to modified accrual (PSSAB 1998) accounting.

Accrual-based accounting has been motivated by concerns about the state of aging infrastructure and a lack of reliable information that could be used to evaluate this concern. Not only would this improve a municipality's ability to collect better information on the state of its infrastructure and permit it to make more informed investment decisions, it would also improve accountability and transparency to taxpayers. These were major reasons why the federal government (but not the provinces or municipalities) in Canada recently implemented a full accrual accounting system that depreciates all federal government capital assets (Bird and Wilson 2003).

Problems with Pricing Services Provided by Municipal Infrastructure

Incorrect and inappropriate pricing (user fees) of services provided by local infrastructure is a serious concern. Incorrect prices lead to over or under-consumption of local services and hence, over or under-investment in local infrastructure. Correct pricing, on the other hand, provides information to both consumers and producers that will lead to more efficient and optimal levels of service and the physical assets that provide them.

Currently, municipalities in Canada fall short of correctly structured user fees on two fronts. First, user fees should be applied to more services, especially those where specific beneficiaries can be identified and non-payers excluded. Examples include water and sewer systems; solid waste disposal; a major portion of public transit and transportation; public recreation; and a variety of other services.

Second, where they are used, they are often improperly designed and structured. For example, many municipalities do not include volumetric charges for water and sewer. Tipping charges for solid waste disposal are seldom based on weight and volume. Charges for public transit are seldom based on distance traveled.

Regardless of the service considered, the conclusion that emerges is this: not much can be said about whether there is too much or too little municipal infrastructure in Canada if efficient prices for services do not exist. To repeat, correctly set prices are important because they reveal the demand for — and therefore indicate the efficient supply of — public infrastructure. Incorrect prices lead to an inefficient use of resources and result in too much infrastructure where prices or taxes do not capture all costs, and too little where they capture more than the costs of services consumed.

Water and Sewage: User fees for water have many structures — fixed charges that do not vary with consumption; flat-rate charges based on property values; and volume-based charges. The latter include constant unit rates, declining block rates, or increasing block rates. A constant unit rate is identical for each litre. A declining block rate generally includes a basic or fixed service charge per period combined with a volumetric charge that decreases as volume increases. An increasing block rate structure, which is rare, increases as consumption increases with no minimum charge. Sewage collection and treatment are funded from surcharges on water bills

— in the form of a flat fee or as a percent of the water bill.

Although the efficiency advantages of marginal cost pricing, in which increased costs are matched by increased prices, are well documented (Kitchen 2000, 2003; Dewees 2002), municipalities seldom implement it. To them, marginal cost pricing looks complex. It requires inclusion of asset replacement costs in annual operating costs, data that is often not kept or calculated. Of considerable importance, provincial grants have provided an incentive for municipalities to overbuild; for example, it has been estimated that between 1974 and 1992 in Ontario, grants led to the construction of water plants that were 44 percent above what was needed (Report of the Water Strategy Expert Panel 2005). Furthermore, since these gransts were almost always treated as free money, water prices have not and often, still do not include a cost component for asset usage and replacement. This leads to prices that are below marginal cost, leading to over-consumption and wasted resources. In fact, a recent estimate for Ontario municipalities indicated that water-related revenues only covered 64 percent of the full costs of providing water and wastewater services. This shortfall has led to "rust-out, less reliable service, more leaks, increasing risk to public health and convenience, environmental damage and demand for subsidies" (Report 2005, 53).

There are a number of things that municipalities can do if they want a more efficient level of water and sewer infrastructure. They must collect information in a form and type that will permit them to approximate marginal cost pricing. Furthermore, prices must capture differences in cost arising from distance from the water source, or by season, or by time of day (Dewees 2002). Finally, marginal-cost pricing cannot be implemented if municipalities are unmetered. Water meters permit a municipality to adopt a volumetric pricing structure and therefore, provide customers with an incentive to consume less water while assuring them that they only pay for what they consume. The evidence suggests that residential water consumption is considerably lower in municipalities with meters than in municipalities without meters (Environment Canada 1999). In general, studies on metering have concluded that a 10 percent increase in price causes a 2 to 4 percent reduction in demand for water (Tate 1990). These studies also suggest that differential prices are effective in reducing peak demand (Report 2005). Finally, all consumers are more responsive to water prices over the long run if increases are deemed to be permanent — they invest in or buy equipment that uses less water (Renzetti 2002).

In summary, initiatives at reforming water and wastewater pricing have emphasized the importance of meters. Most have promoted the implementation of proper accounting, budgeting, asset replacement costs and information retrieval systems as well as the adoption of innovative pricing practices. Most support time of use prices to capture variations in costs according to the time of day or season of the year and many have multi-part tariffs to improve consumption efficiency and at the same time recover all fixed costs of production.

One Canadian study suggested that marginal cost pricing of water would lead to welfare gains of approximately 4 percent for the Greater Vancouver Water District (Renzetti 1992). A more recent study based on 77 water utilities in Ontario (Renzetti 1999) concluded that the marginal cost of supplying water exceeded the

price of water in every municipality studied leading to higher water consumption and more investment in water plants than is efficient.

Public Transit and Transportation: Municipal public transit systems are funded mainly by fare box revenue, municipal tax revenue and grants. Concern about operating deficits has led to discussions over the level of fares and fare structure. Local government officials consider a number of social, economic and political factors in setting fares, such as the availability of, and access to, substitute forms of transportation, including the ability of local residents to pay for transit services, the attitudes of local politicians towards acceptable levels of fares, and the portion of operating costs to be recovered from fare box revenue (Kitchen 1990).

Asking public transit users to pay a price equal to the full marginal social cost would be efficient and fair only if private transit (automobiles) users paid a tax or charge that reflected their full marginal social cost. Because the latter does not happen, marginal cost pricing for public transit is not efficient. Here, efficiency should be pursued through the second-best solution of subsidizing local public transit.

Current fare structures often create economic problems through what they do and don't do. Failure to charge higher prices in peak hours creates an incentive to over-invest in public transit infrastructure and provides greater capacity than can be justified on efficiency grounds. However, higher peak-load fares may discourage public transit use and increase the use of private autos. Problems generated by the lack of peak-load charges on public transit systems are complicated by the availability of discount fares. These discounts are used primarily by rush-hour travelers, effectively lowering the per-trip charge precisely at a time when higher fares could make more economic sense. Subsidies that are provided on the basis of age (seniors and students) unrelated to income are difficult to support on efficiency grounds.

Because the marginal cost of carrying a rider varies with distance traveled, failure to use zone charges within large metropolitan areas creates efficiency and fairness problems. Fixed fares mean that short-distance travelers overpay while long-distance travelers underpay, creating an incentive for travelers to live further from their destination than they would in the absence of zone charges.

To prevent excessive auto use, a more effective and direct policy might include the imposition of a local tax on parking lots and the adoption of a local fuel tax, with revenues earmarked to fund public transit and transportation systems. Parking lot taxes would be appropriate for all municipalities, while a fuel tax would be most effective in large cities and metropolitan areas. Municipalities should also be permitted to issue a driver's license to residents with differential fees to reflect driving records; for example, evidence suggests that 20 percent of drivers are responsible for 80 percent of accidents (Bird 2003). Hence, charging higher fees to those in high-risk categories is efficient. As well, municipalities could impose their own vehicle registration fees on automobile owners, as is done in Vancouver, based on features of the car. This could be aimed at addressing certain externalities, such as car age for pollution, or axle weight for road maintenance (Bird 2004).

However, the best way of pricing roads to capture the marginal social cost is a congestion charge or toll, as was done in London in 2003. London's toll led to a

reduction in congestion by 15 percent and raised £130 million, which was used to improve the city's transportation system, especially bus routes (Transport for London 2004). Singapore's road pricing scheme is particularly interesting. It is designed as a means of managing traffic and not to raise maximum revenues. In 1998, Singapore introduced its current Electronic Road Pricing (EPR) system based on the "pay-as-you-use" principle, which entails charging motorists for use of roads at peak hours. Traffic conditions on roads where ERP is in operation are reviewed regularly and the price charged is adjusted to minimize congestion as necessary (Bird 2004; Menon and Keong 1998).

Landfill Sites: Municipally operated landfill sites in Canada are almost always funded by local taxes or fixed fees rather than by tonnage charges. This leads to over use and wasted resources; a situation that could be corrected, partially at least, if disposal charges covered current operating costs. These include the opportunity cost of space plus amortized capital costs of the landfill site, closure and post-closure costs, and the value of potential environmental damage (Dewees 2002).

A number of studies in the United States suggest that charging a fee per bag or container leads to a substantial reduction in the volume of garbage shipped to landfill sites (Miranda and Aldy 1996; US EPA 2004); thus extending the life of existing landfill sites and reducing the demand for additional space. Similarly, a study for the Greater Toronto Area estimated that a $1.00 per-bag fee for solid waste collection would divert between 4 and 14 percent of materials from landfill sites (Ontario 1994). When a small town in south-western Ontario (Clinton) introduced a per-bag charge for garbage collection in the early 1990s, the number of garbage bags put out by households declined by roughly 50 percent, while the weight of the garbage fell by about 25 percent. Households reduced their garbage collection charges by packing garbage bags more fully, but they also recycled more (Palmer 2001). In general, all studies report that user fees reduce solid waste because consumers increase recycling, generate less waste, and increase the use of other options such as composting; all of which have reduced the demand for solid waste disposal sites. In short, prices work!

Public Recreation: Municipal recreation facilities are funded by property taxes and user fees — arenas, fields, pools, golf courses, etc. rely on admissions, rentals, instruction fees, and so on. Funding from property taxes means that users are subsidized by non-users. This practice is supported by those who argue that recreational facilities generate positive externalities or spillovers in the form of a more physically fit and healthier society and, hence, lower medical costs for everyone. The extent of these effects, however, should not be exaggerated.

Because the largest portion of the benefits accrue directly to users, these services should be priced so as to extract sufficient revenues to cover a comparable portion of the costs. The public sector, unfortunately, has not adopted many aspects of private pricing for recreational services. Private suppliers, faced with the prospect of recovering all costs through their pricing structures, have recognized the advantages of annual fixed levies plus admission charges for use of the facility. Municipalities virtually never follow this approach.

With the exception of a few local public facilities, such as arenas and golf courses in Canada, access to municipally provided facilities is generally rationed

by queuing rather than prices. Failure to adopt a peak-load pricing policy to even out the demand over a day and a week has led to over-investment in many recreational facilities. This has been aggravated further by reduced charges for children, students, and sometimes, seniors (lower rates for skating, swimming, etc.) at all times. Lower fares for specific groups, on the other hand, might be justified in the presence of restrictions limiting them to use of the facility in off-peak hours.

Summary

Growing concern over the state of municipal infrastructure has highlighted the importance of municipal capital spending and the way in which it is financed. As municipalities grow, they need to expand or replace their capital stock. Water plants and sewage treatment facilities, recreational facilities, transportation and communication facilities — all need updating and expanding. Brownfield remediation must be addressed, and "blighted" areas of cities revitalized and redeveloped.

Infrastructure is an acute issue for municipalities. Municipalities are the venue for most physical infrastructure in Canada and it is here where the most serious problems in terms of rehabilitation, repair and expansion seem to exist. Compared to provinces, moreover, municipalities face more constraints on their spending and financing activities. They only have access to one tax — the property tax — a few user fees, grants that are determined by senior levels of government, and borrowing. As an aside, it has been suggested that because municipalities have access to federal and provincial gas tax revenue, the GST rebate, and contribution programs that cost-share capital projects, this constitutes a range of local taxes. This view is incorrect, however, because municipalities have no control over the associated revenue-sharing formulas, tax bases, or tax rates. Analytically, these are no different than conditional or unconditional grants.

For the vast majority of municipalities, capital grants have fallen in relative importance and borrowing has declined since the early 90s. At the same time, own-source revenue has become more important, pointing to an increased emphasis on "pay-as-you-go" financing for capital projects — a practice that is contrary to financing on the basis of benefits received.

Capital expenditures differ from operating expenditures in two important respects — they are lumpy and are financed by a wider range of revenue sources. Capital funds may be drawn from a variety of internal sources including local taxes, user fees, reserves, special charges consisting of specific assessments and development charges. External funding comes from grants and long-term borrowing, and very occasionally from tax incremental financing districts and public-private partnerships. Capital spending, however, should not be initiated by a local or municipal council until it has articulated a multi-year capital budget that lays out current and future capital expenditure requirements and the way these expenditures are to be financed.

Financing should be based on the benefits model of governmental finance. Here, the underlying principle is straightforward — those who benefit from a service pay for it. There are a number of advantages of this approach. Whenever a

direct link exists between the users of a service and its funding, a more efficient use of resources ensues. Accountability, transparency, and fairness also result. Unfortunately, many of the instruments currently used by municipalities are either used in an inefficient way or at the wrong time.

Uniform development charges fail to achieve an efficient allocation of resources because properties that cost less to service subsidize properties that are more expensive to service. Switching to a charge that varies by property or neighbourhood according to servicing cost would lead to a better matching of payment for services with the capital cost of the assets provided and an improved allocation of local resources.

At the same time, there are solid arguments for municipalities having access to new financing instruments, including revenue bonds. These are desirable on allocative efficiency grounds for financing local capital or infrastructure projects that produce reliable annual revenue streams — water and sewer systems, for example. General obligation bonds, which municipalities currently use, should finance capital projects that do not generate annual revenues — roads and streets. Tax incremental financing districts would be an effective and efficient tool for brownfield remediation, urban redevelopment and infilling.

Another important initiative includes provinces giving cities and city-regions access to a dedicated municipal fuel tax. This differs from the current revenue-sharing scheme in which the federal government transfers to municipalities grant revenue generated by the federal gas tax. In this context, a dedicated fuel tax should require municipalities to set their own tax rate and piggy-back onto the provincial gas tax. Municipalities should also be given the right to implement municipal taxes on parking lots, vehicle registration fees, and tolls or congestion charges. In fact, the latter would be superior to vehicle registration and parking levies because it could be set to reflect usage by time of day, and congestion.

Greater use of public-private partnerships could alleviate some financing concerns by passing the burden onto the private sector, albeit with a role for the government in the form of price regulation or monitoring.

Because public infrastructure has a long life, municipalities should move to a system of full accrual accounting where all capital assets are depreciated and amortized over their expected life, rather than expensed in the year of purchase.

Perhaps the most important, yet often overlooked, issue in discussing infrastructure financing revolves around the current disconnect between payment by users and service received. This has produced too much public capital in some sectors and too little in other sectors. For the most part, our cities and towns fail to set user fees that vary by time of day, season of the year, when capacity constraints exist, when second-best considerations are prevalent, when externalities are observed. They generally fail to include all costs (asset replacement costs and a variety of opportunity costs) in pricing structures. This has led to a demand for services and, subsequently, a demand for physical infrastructure that is not allocatively efficient or optimal. Municipalities should adopt efficient demand-management and conservation-pricing structures before undertaking any major infrastructure program.

The Way Ahead

My analysis drives the following recommendations:

- Municipalities should establish multi-year capital budgets, adopt fund accounts wherever possible, use accrual accounting with an annual measure of depreciation or capital replacement costs, and develop and document asset management programs.
- Capital spending should be financed by its beneficiaries: those who benefit from local infrastructure and the services it provides should pay for it.
- Municipalities should adopt demand-management and conservation-based pricing for their services, by charging for water and sewage according to usage, and charging for landfill use by weight or volume, and charging for recreation facilities according to usage.
- Municipalities should finance short-lived assets via general revenues, and use debt to finance "lumpy" infrastructure that benefits future generations.
- Municipalities should use development charges with variable rates (to capture differences in costs for financing) and use special charges for projects that benefit specific properties. Earmarked user fees are appropriate for financing capital projects where specific beneficiaries can be identified and all costs captured.
- Provincial governments that currently control the operations of municipalities should permit them to issue revenue bonds for local infrastructure that generates a reliable annual revenue stream. They should permit municipalities to levy a dedicated municipal fuel tax, additional taxes on local parking lots, automobile registration fees, and congestion or toll charges, and introduce legislation permiting cities to employ tax-increment financing for brownfield remediation, urban redevelopment and infilling.
- Municipalities should evaluate public-private partnerships (P3s) for financing and delivering suitable infrastructure projects.

While the discussion in this paper is constructively critical of the current practices for financing much of our local infrastructure, dramatic improvements are possible. Among them, moving to a benefits-based model, where feasible, is particularly important, because it satisfies five key principles: economic (allocative) efficiency; accountability; transparency; fairness; and ease of administration. Such improvements may prove central to repairing the ability of cities to deliver the services and quality of life their citizens expect and deserve.

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